

Attorney Docket No. SEM4492P1360US
Corporate Docket No. P00-0000

WE CLAIM:

1. A processing apparatus for processing a microelectronic workpiece,
comprising:

an in-line metrology unit having a space for receiving a microelectronic

workpiece for measuring a condition of a first layer on said

microelectronic workpiece and generating a condition signal;

a control, signal-connected to said metrology unit;

a process unit providing a space to receive said microelectronic workpiece
and performing a process that is controlled by said control;

wherein said condition signal from said metrology unit to said control
influences said process.

2. The apparatus according to claim 1, further comprising a non-
compliance unit, and a microelectronic workpiece transport signal-
connected to said control, wherein said condition signal from metrology
unit influences said control to cause said microelectronic workpiece
transport to transfer the microelectronic workpiece to said non-
compliance unit.

3. The apparatus according to claim 1, wherein said first layer comprises a seed layer, and further comprising a seed layer enhancement unit, and a microelectronic workpiece transport signal-connected to said control, wherein said condition signal from said metrology unit influences said control to cause said microelectronic workpiece transport to transport a microelectronic workpiece to said seed layer enhancement unit.

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4. The apparatus according to claim 1, wherein said process unit comprises an electroplating reactor having at least one anode and a workpiece holder to hold a microelectronic workpiece as cathode, and said process is dependent on the current between said anode and said cathode, said control adjusting said current in response to said condition signal.

5. The apparatus according to claim 4, wherein said condition signal is representative of a thickness of a seed layer applied onto said microelectronic workpiece.

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6. The apparatus according to claim 4, wherein said electroplating reactor comprises a plurality of anodes and said control adjusting current between each anode and said cathode.

7. The apparatus according to claim 1, wherein said process unit comprises a chemical mechanical polishing tool.

8. The apparatus according to claim 1, wherein said process unit comprises a chemical mechanical polishing tool, and said first layer comprises a layer on said workpiece just prior to chemical mechanical polishing by said chemical mechanical polishing tool.

9. The apparatus according to claim 1, wherein said process unit comprises a chemical mechanical polishing tool, and said first layer comprises a layer on said workpiece just after chemical mechanical polishing by said chemical mechanical polishing tool.

10. The apparatus according to claim 1, wherein said process unit comprises a photoresist exposure tool.

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11. The apparatus according to claim 1, wherein said process unit comprises a photoresist exposure tool, and said first layer comprises a photoresist layer on said workpiece just prior to exposure by said photoresist exposure tool, and said condition to be measured is the photoresist thickness.

12. The apparatus according to claim 1, wherein said process unit comprises a photoresist exposure tool, and said first layer comprises a photoresist layer on said workpiece just after develop by a subsequent develop tool, and said condition to be measured is the pattern dimension.

13. A method of processing a microelectronic workpiece, comprising the steps of:
providing two processing tools each of which further processes a microelectronic workpiece in a preselected process;
using an in-line metrology unit, determining a condition of a layer on said microelectronic workpiece at one of the tools; and
in response to a signal from the metrology unit, modifying a process parameter in the respective other tool.

14. The method according to claim 13, comprising the further step of providing a third process tool in a preselected process order with respect to the two consecutive processing tools, and modifying process parameters in said third processing tool in response to said signal from said metrology unit.

15. The method according to claim 13, wherein said microelectronic workpiece is processed first in said one processing tool and subsequently in said respective other processing tool.

16. The method according to claim 13, wherein said microelectronic workpiece is processed first in said respective other processing tool and subsequently in said one processing tool.

17. A processing apparatus for processing a microelectronic workpiece, comprising:
an in-line metrology unit having a space for receiving a microelectronic workpiece and configured to generate condition data in response to a measured condition on said microelectronic workpiece;
a processing unit providing a space to receive a microelectronic workpiece to process a layer on said microelectronic workpiece;

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~~a control, signal-connected to said metrology unit and to said processing unit
to control said process of said microelectronic workpiece depending on
said condition data.~~

18. The apparatus according to claim 17, wherein said processing unit comprises an electrochemical deposition unit.

19. The apparatus according to claim 17, wherein said processing unit comprises a chemical mechanical polishing unit.

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By 20. The apparatus according to claim 17, wherein said measured condition comprises a seed layer thickness.

21. The apparatus according to claim 17, wherein said measured condition comprises a finished electroplated material thickness.

22. The apparatus according to claim 17, wherein said measured condition comprises a finished chemical mechanical polished thickness.

23. A processing apparatus for processing a microelectronic workpiece, comprising:

a seed layer unit providing a space to receive said microelectronic workpiece to effect deposition of a seed layer on said microelectronic workpiece;

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an electrochemical deposition unit providing a space to receive said microelectronic workpiece having said seed layer, to deposit a process layer thereon;

a chemical mechanical polishing tool providing a space to receive said microelectronic workpiece and having a polishing mechanism for removing material from said process layer to form a polished layer;

Check
a metrology unit having a space for receiving a microelectronic workpiece, and arranged to measure a layer thickness on said microelectronic workpiece and to transmit a condition signal;

a control unit, signal-connected to said metrology unit; wherein said condition signal from said metrology unit causes said control to adjust process parameters in at least one of said seed layer unit, said electrochemical deposition unit, and said chemical mechanical polishing tool.

24. The apparatus according to claim 23, wherein said metrology unit measured layer thickness is a thickness of said seed layer.

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25. The apparatus according to claim 23, wherein said metrology unit measured layer thickness is a thickness of said process layer.
26. The apparatus according to claim 23, wherein said metrology unit measured layer thickness is a thickness of said polished layer.

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